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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application No.	10/033,854
Filing Date	December 19, 2001
First Named Inventor	Mahesh Sambasivam
Art Unit	2823
Examiner Name	Khiem D. Nguyen
Total Number of Pages in This Submission	
Attorney Docket Number	42390P13267

ENCLOSURES ***(check all that apply)***

- [X] Fee Transmittal Form
  - [X] Fee Attached
- [ ] Amendment / Response
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
  - [ ] PTO/SB/08
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
  - [ ] Basic Filing Fee
  - [ ] Declaration/POA
  - [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s)
- [ ] After Allowance Communication to Group
- [ ] Appeal Communication to Board of Appeals and Interferences
- [X] Appeal Communication to Group **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [X] Other Enclosure(s) *(please identify below):*
  - Check for $330.00
  - Appeal Brief in triplicate (15 pgs. each)
  - Return Receipt Postcard

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Paul A. Mendonsa, Reg. No. 42,879 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Signature	
Date	August 16, 2004

CERTIFICATE OF MAILING/TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Signature		Date	**August 16, 2004**

Based on PTO/SB/21 (04-04) as modified by Blakely, Sokoloff, Taylor & Zafman (wtr) 06/04/2004.
SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

FEE TRANSMITTAL for FY 2004

Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT ($) 330.00

Complete if Known	
Application Number	10/033,854
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METHOD OF PAYMENT *(check all that apply)*

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None
☐ Deposit Account

Deposit Account Number: 02-2666

Deposit Account Name: Blakely, Sokoloff, Taylor & Zafman LLP

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES

			Extra Claims		Fee from below		Fee Paid
Total Claims	20	- 20* =	0	X	18.00	=	$0.00
Independent Claims	3	- 3* =	0	X	86.00	=	$0.00
Multiple Dependent						=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple Dependent claim, if not paid
1204	86	2204	43	**Reissue independent claims over original patent
1205	18	2205	9	**Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0.00

***or number previously paid, if greater, For Reissues, see below*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1404	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	2460	130	Petitions to the Commissioner	
1807	50	1807	50	Prosessing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	1809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 330.00

SUBMITTED BY

Complete (if applicable)

Name *(Print/Type)*	Paul A. Mendonsa	*Registration No. (Attorney/Agent)*	42,879	*Telephone*	(503) 439-8778
Signature				*Date*	08/16/04

Based on PTO/SB/17 (10-03) as modified by Blakely, Sokoloff, Taylor & Zafman (wlr) 02/10/2004.
SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Patent Application of: Sambasivam, et al.	Confirmation No. 9103
Serial No.: 10/033,854	Art Unit: 2823
Filed: December 19, 2001	Examiner: Khiem Nguyen
For: UNDERFILL MATERIALS DISPENSED IN A FLIP CHIP PACKAGE BY WAY OF A THROUGH HOLE	
Attorney Docket No.: 42390.P13267	

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

APPEAL BRIEF
IN SUPPORT OF APPELLANTS' APPEAL
TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

Sir:

The Applicant (hereafter "the Appellant") hereby submits this Brief in triplicate in support of his Appeal from a final decision by the Examiner in the above-captioned case. The Appellant respectfully requests consideration of this Appeal by the Board of Patent Appeals and Interferences for allowance of the claims in the above-captioned patent application.

An oral hearing is not desired.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The invention is assigned to Intel Corporation of 2200 Mission College Boulevard, Santa Clara, California 95052.

II. RELATED APPEALS AND INTERFERENCES

To the best of Appellant's knowledge, there are no appeals or interferences related to the present appeal, which will directly affect, be directly affected by, or have a bearing on the Board's decision.

III. STATUS OF THE CLAIMS

Claims 1-20 are the subject of the present appeal.

Claims 1-20 stand rejected under 35 U.S.C. § 103(a) as being obvious over Applicant's Admitted Prior Art (hereinafter "AAPA") in combination with U.S. Patent No. 5,766,982 issued June 16, 1998 to Salman Akram and James Wark (hereinafter "the Akram patent") and U.S. Patent No. 6,242,798 issued June 5, 2001 to Gi-Bon Cha and Byeong-Duck Lee (hereinafter "the Cha patent").

IV. STATUS OF AMENDMENTS

In response to the Advisory Action mailed on June 15, 2004, the Appellants timely filed a Notice of Appeal. In the December 16, 2003 Amendment, independent claim 1 (from which claims 2-6 depend), independent claim 7 (from which claims 8-12), and independent claim 13 (form which claims 14-20) were amended to clarify that the underfill material is dispersed by capillary action.

A copy of all claims on appeal, claims 1-20, is attached hereto as Appendix A.

IV. SUMMARY OF THE INVENTION

An exemplary microelectronic package includes a microelectronic die that is mounted on a substrate, which functionally connects the microelectronic die through a hierarchy of electrically conductive paths to the other electronic components. The method for mounting the microelectronic die to the substrate is called flip chip bonding, wherein electrically conductive terminals or pads on an active surface of the microelectronic die are attached directly to corresponding lands on a surface of the substrate using reflowable solder bumps or balls,

thermocompression bonding, or any other known methods of flip chip attachment. Background of the Invention, page 2, line 15 to page 3, line 15, line 2.

To enhance the reliability of the solder bumps connecting the microelectronic die pads and the substrate lands, an underfill material is used to mechanically and physically reinforce them. In a known method of underfill encapsulation, a low viscosity underfill material, such as an epoxy material, is dispensed from at least one dispensing needle along at least one edge (usually one or two edges) of the microelectronic die. The underfill material is drawn between the microelectronic die and the substrate by capillary action, and the underfill material is subsequently cured using heat, which forms the microelectronic package. Background of the Invention, page 3, lines 3-11.

With the pressure to decrease the size of the microelectronic packages, bump pitch and bump height has decreased. Thus, it has become successively more difficult to obtain adequate underfill material dispersion without continuously deceasing the viscosity of the underfill material or improving its wettability properties. However, decreasing the viscosity and/or improving the wettability of the underfill material results in the underfill material bleeding out and substantially surrounding the microelectronic die. This bleedout area beyond the edges of the microelectronic die is generally referred to as the "underfill tongue". The underfill tongue is a problem because it covers and contaminates valuable surface area on the substrate. . Background of the Invention, page 3, lines 12-22.

The present invention relates to forming a microelectronic device disposing an underfill material between a substrate and a flip chip by providing a through-hole through the substrate, wherein the underfill material is delivered through the though-hole. Detailed Description, page 7, lines 19-21.

FIGs. 1-7 illustrate a method of forming an exemplary microelectronic device. FIG. 1 illustrates a substrate 102, including a plurality of lands 104 disposed on a first surface 106 thereof. The substrate lands 104 are connected to a hierarchy of electrical conductive paths (not shown) to other electronic components (not shown) to provide electrical connection thereto with a subsequently mounted microelectronic die. As shown in FIG. 2, a through-hole 108 is formed through the substrate 102 extending from the substrate first 106 to an opposing second surface 110. Detailed Description, page 7, line 22 to page 8, line 5.

As shown in FIG. 3, a microelectronic die 112 is electronically mounted on the substrate 102. The illustrated method for electronically mounting the microelectronic die 112 to the substrate 102 is the attachment methods previously discussed. Electrically conductive

terminals or lands 116 on an active surface 118 of the microelectronic die 112 are attached directly to the corresponding substrate lands 104 using conductive bumps or balls 114, such as leaded or lead-free reflowable solders ball (preferred), leaded or lead-free solder paste, metal filled epoxy, and the like. The resulting structure is then flipped, as shown in FIG. 4, to expose the through-hole 108 from the substrate second surface 110. This flipping of the structure places the structure in an orientation such that the microelectronic die 112 is gravitationally below the substrate 102. In other words, gravity pulls toward the microelectronic die 112 relative to the substrate 102. Detailed Description, page 8, line 14 to page 9, line 2.

An underfill dispensing tool 122, such as a dispense needle, is positioned in or proximate to the through-hole 108 and an underfill material 124 is dispensed through the underfill dispensing tool 122 and into the through-hole 108, as shown in FIG. 5. Detailed Description, page 9, lines 3-5.

As shown in FIG. 6, capillary action distributes the underfill material 124 substantially evenly in all directions (illustrated by arrows 120) during injection. As further shown in FIG. 5, the underfill material 124 flows around the conductive bumps 114 and forms a fillet 126 proximate edges 128 of the microelectronic die 112. The combination of the gravity pulling the underfill material 124 toward the microelectronic die 112 and the inherent surface tension of the underfill material 124 will restrict the flow of the underfill material 124 proximate the microelectronic die edges 128. Thus, this process substantially reduces underfill tongue. It is, of course, understood that the through-hole 108 should be positioned in relation to the pattern of the conductive balls 114 such that the underfill material 124 distributes itself substantially evenly. Furthermore, it is preferred that a predetermined amount of underfill material 124 be used, as an excess amount may overcome the surface tension at the fillet 126, causing the underfill material 124 to drip. Detailed Description, page 9, lines 9-20.

The underfill dispensing tool 122 is withdrawn and the underfill material 124 is then cured, resulting in the microelectronic package 130, as shown in FIG. 7. It is preferred that the conductive bumps or balls 114 are reflowed for attachment prior to dispensing the underfill material. However, it is understood that the reflow (if necessary) of conductive bumps or balls 114 for the attachment of the microelectronic die 112 would also be achieved simultaneously with the curing of the underfill material 124. Furthermore, although the underfill material 124 is preferably curing while inverted, it may be cured in any position. Detailed Description, page 9, line 19 to page 10, line 5.

Although inverting the resulting structure, as shown in FIG. 4, and performing the fabrication steps of FIGs. 5 and 6, it is not necessary As shown in FIG. 8, the underfill dispensing tool 122 may be positioned in or proximate to the through-hole 108 without inversion and the underfill material 124 is dispensed through the underfill dispensing tool 122 and into the through-hole 108. Capillary action distributes the underfill material 124 substantially evenly around the conductive bumps 114 and forms the fillet 126 proximate edges 128 of the microelectronic die 112. Again, it is preferred that a predetermined amount of underfill material 124 be used. Detailed Description, page 10, line 6-13.

VI. ISSUES PRESENTED

Whether claims 1-20 are obvious under 35 U.S.C. § 103(a) over the Akram patent in combination with the Akram patent and the Cha patent.

VII. GROUPING OF CLAIMS

For the purposes of this appeal:

Claims 1-20 stand or fall together.

VIII. ARGUMENT

REJECTION OF CLAIMS 1-20 UNDER 35 U.S.C. § 103(a) OVER THE AAPA IN COMBINATION WITH THE AKRAM PATENT AND THE CHA PATENT IS IMPROPER, AS THE REFERENCE DOES NOT TEACH OR SUGGEST ALL OF THE CLAIM LIMITATIONS. THUS, A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner has rejected claims 1-20 stand rejected under 35 U.S.C. § 103(a) as being obvious over the AAPA in combination with the Akram patent and the Cha patent.

The first independent claim, claim 1, is drawn to a method of fabricating a microelectronic package, comprising providing a substrate having a first surface, an opposing second surface, and a plurality of lands disposed on the first surface, forming a through-hole extending from the substrate first surface to the substrate second surface, providing a microelectronic die having an active surface, a back surface, and a plurality of pads disposed on said active surface in a corresponding relationship to the plurality of substrate lands, electrically attaching the plurality of substrate lands to the plurality of corresponding microelectronic die pads with a plurality of conductive bumps, and disposing an underfill material through the through-hole such that said underfill material is dispersed by capillary action between the microelectronic die active surface and the substrate first surface. Claim 2 depends from claim 1 and further includes the additional limitation that forming the through-hole comprises forming the through-hole by at least one of the methods consisting of drilling, laser ablation, and etching. Claim 3 depends from claim 1 and further includes the limitation that disposing the underfill material comprises positioning an underfill material dispensing device proximate the through-hole and injecting the underfill material into the through-hole. Claim 4 depends from claim 1 and further includes the limitation that positioning the underfill material dispensing device proximate the through-hole comprises positioning a dispensing needle proximate the through-hole. Claim 5 depends from claim 1 and further includes the limitation that disposing the underfill material comprises disposing an epoxy material. Claim 6 depends from claim 1 and further includes the limitation of further including curing the underfill material.

The second independent claim, claim 7, is drawn to a method of fabricating a microelectronic package, comprising providing a substrate having a first surface, an opposing second surface, and a plurality of lands disposed on the first surface, forming a through-hole extending from the substrate first surface to the substrate second surface, providing a microelectronic die having an active surface, a back surface, and a plurality of pads disposed on the active surface in a corresponding relationship to the plurality of substrate lands, electrically attaching the plurality of substrate lands to the plurality of corresponding microelectronic die pads with a plurality of conductive bumps, positioning the microelectronic die and the substrate such that the microelectronic die is gravitationally below the substrate; and disposing an underfill material through the through-hole such that the underfill material is dispersed by capillary action between the microelectronic die active surface and the substrate first surface. Claim 8 depends from claim 7 and includes the additional limitation that forming the through-hole comprises forming the through-hole by at least one of the methods consisting of drilling,

laser ablation, and etching. Claim 9 depends from claim 7 and includes the additional limitation that disposing the underfill material comprises positioning an underfill material dispensing device proximate the through-hole and injecting the underfill material into the through-hole. Claim 10 depends from claim 9 and includes the additional limitation that positioning the underfill material dispensing device proximate the through-hole comprises positioning a dispensing needle proximate the through-hole. Claim 11 depends from claim 7 and includes the additional limitation that disposing the underfill material comprises disposing an epoxy material. Claim 12 depends from claim 7 and includes the additional limitation of further including curing the underfill material.

The third independent claim, claim 13, is drawn to a method of fabricating a microelectronic package, comprising providing a substrate having a first surface, an opposing second surface, a plurality of lands disposed on the first surface, and at least one wirebond land on the first surface, forming a through-hole extending from the substrate first surface to the substrate second surface, providing a microelectronic die having an active surface, a back surface, and a plurality of pads disposed on the active surface in a corresponding relationship to the plurality of substrate lands, electrically attaching the plurality of substrate lands to the plurality of corresponding microelectronic die pads with a plurality of conductive bumps, disposing an underfill material through the through-hole such that the underfill material is dispersed by capillary action between the microelectronic die active surface and the substrate first surface, providing a second microelectronic die having an active surface, a back surface, and at least one wirebond pad disposed on the active surface, attaching the second microelectronic die back surface to the microelectronic die back surface, and attaching at least one wirebond between at least one substrate wirebond land and the second microelectronic die wirebond pad. Claim 14 depends from claim 13 and includes the additional limitation that forming the through-hole comprises forming the through-hole by at least one of the methods consisting of drilling, laser ablation, and etching. Claim 15 depends from claim 13 and includes the additional limitation that disposing the underfill material comprises positioning an underfill material dispensing device proximate the through-hole and injecting the underfill material into the through-hole. Claim 16 depends from claim 15 and includes the additional limitation that positioning the underfill material dispensing device proximate the through-hole comprises positioning a dispensing needle proximate the through-hole. Claim 17 depends from claim 13 and includes the additional limitation that disposing the underfill material comprises disposing an epoxy material. Claim 18 depends from claim 13 and includes the additional limitation of further

including curing the underfill material. Claim 19 depends from claim 13 and includes the additional limitation that attaching the second microelectronic die back surface to the microelectronic die back surface comprises disposing a layer of adhesive therebetween. Claim 20 depends from claim 13 and includes the additional limitation of further including positioning the microelectronic die and the substrate such that the microelectronic die is gravitationally below the substrate prior to disposing the underfill material.

The Final Office Action relied on the AAPA (i.e., the background section of the present application) for a teaching of a flip chip attached to a substrate with an underfill material dispersed therebetween. Although the AAPA refers to capillary action to draw underfill from an edge of a flip chip, the Final Office Action at page 3 admits that the AAPA fails to disclose forming a through hole extending from the substrate first surface to the substrate second surface and disposing the underfill material through the through hole.

The Akram patent teaches placing a hole through the substrate and dispensing an underfill material therethrough. The Final Office Action at page 4 erroneously contended that the Akram patent teaches "that the underfill material is dispersed by capillary action (col. 1, lines 46-58 and FIG. 5)". In reality, the cited section of col. 1, lines 46-58 is merely a statement of a prior art teaching that is no different than the prior art teaching in the Applicants' application (i.e., injecting the underfill along two or more sides of the flip-chip and flowing underneath by capillary action). Even though the Akram mentions this method in passing in the Background of the patent (just as does the Applicants' specification), it is neither taught nor suggested that it can be used in the Akram invention. In fact, it is quite the oppose, the Akram invention teaches away from dispersing by capillary action, as it teaches tipping the assembly in order get the underfill material to flow between the microelectronic die and the substrate. In fact, the figure that the Office cites (i.e., FIG. 5) uses a dam 40 to prevent the flow of the underfill material from between the substrate and the microelectronic die. The use of dams or other such underfill tongue prevention devices is exactly what the present invention eliminates. The Office is respectfully reminded that a prior art reference also must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention. M.P.E.P. § 2141.02, *citing, W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Clearly, the Akram patent neither teaches nor suggest disposing an underfill material through said through-hole such that said underfill material is dispersed by capillary action between the microelectronic die active surface and the substrate first surface.

The Office is respectfully reminded, as set forth in MPEP "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teachings, suggestion, or motivation to do so found in the references, *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347 (Fed. Cir. 1992). A showing of a suggestion, teaching, or motivation to combine prior teachings "must be clear and particular." *In re Dembiczak*, 175 F.3d 994, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999). A teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Applicants could find no teaching or suggest within the prior art (I.e., Akram patent nor the AAPA) to combine the references in a manner which would render the presently claims obvious.

The Cha patent is relied upon for teaching "that epoxy can be applied from the top down through a through hole instead of injected upward." It was assumed that the Examiner was referring to claims 7-12 and 20, as they are the only claims that contain such a limitation. However, the Cha patent also does not teach or suggest to dispersing the epoxy material by capillary action.

Furthermore, "[i]n order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the invention was concerned." In re Oetiker, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992) (See M.P.E.P. 2141.01(a)). The Cha patent involves a different field of endeavor, as it is merely encapsulating a wirebonded chip with an encapsulation material. The Cha patent teaches dispensing an encapsulant material (i.e., epoxy resin) into what is in essence a closed container (see FIG. 5B of the Cha patent). The presently claimed invention is a flip-chip configuration wherein there is a gap around the periphery of the flip-chip microelectronic die, not a "closed container", as shown in the Cha patent. Thus, with such a gap, conventional wisdom would assume that dispensing the underfill material with the microelectronic die gravitationally below the substrate would result in the underfill material running out of the gap and dripping from the microelectronic die. Thus, it should be clear that encapsulating a wirebonded chip in a closed container is a different endeavor from dispensing the underfill material as described in the present invention.

Therefore, it respectfully appears to the Applicant that the Office has impermissibly taken isolated, non-analogous art and used the claimed invention as template to piece together the teachings of the prior art so that the claimed invention is rendered obvious. It also appears the Office did not take into account only knowledge which was within the level of ordinary skill in art at the time the claimed invention was made and includes knowledge gleaned from the Applicants' disclosure, thus the reconstruction is improper. In re McLaughlin, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

Thus, as neither the AAPA, the Akram patent, nor the Cha patent teach or suggest the presently claimed invention, a prima facie case of obviousness has not been established. Therefore, the Appellants submit that claims 1-20 recite patentable subject matter.

IX. CONCLUSION

Appellants respectfully submit that all the pending claims in this patent application are patentable and request that the Board of Patent Appeals and Interferences overrule the Examiner and direct allowance of the rejected claims.

This brief is submitted in triplicate, along with a check for $330.00 to cover the appeal fee for one other than a small entity as specified in 37 C.F.R. § 1.17(c).

Respectfully submitted,

Date: August 16, 2004

Robert G. Winkle
Attorney for Appellants
Registration Number: 37,474

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Los Angeles, CA 90025-1026
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on:

16 August 2004
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Deborah L. Higgins
Name of Person Mailing Correspondence

Signature 8-16-04
Date

APPENDIX A: CLAIMS ON APPEAL

1. A method of fabricating a microelectronic package, comprising:

providing a substrate having a first surface, an opposing second surface, and a plurality of lands disposed on said first surface;

forming a through-hole extending from said substrate first surface to said substrate second surface;

providing a microelectronic die having an active surface, a back surface, and a plurality of pads disposed on said active surface in a corresponding relationship to said plurality of substrate lands;

electrically attaching said plurality of substrate lands to said plurality of corresponding microelectronic die pads with a plurality of conductive bumps,

disposing an underfill material through said through-hole such that said underfill material is dispersed by capillary action between said microelectronic die active surface and said substrate first surface.

2. The method of claim 1, wherein forming said through-hole comprises forming said through-hole by at least one of the methods consisting of drilling, laser ablation, and etching.

3. The method of claim 1, wherein disposing said underfill material comprises positioning an underfill material dispensing device proximate said through-hole and injecting said underfill material into said through-hole.

4. The method of claim 1, wherein positioning said underfill material dispensing device proximate said through-hole comprises positioning a dispensing needle proximate said through-hole.

5. The method of claim 1, wherein disposing said underfill material comprises disposing an epoxy material.

6. The method of claim 1, further including curing said underfill material.

7. A method of fabricating a microelectronic package, comprising:

providing a substrate having a first surface, an opposing second surface, and a plurality of lands disposed on said first surface;

forming a through-hole extending from said substrate first surface to said substrate second surface;

providing a microelectronic die having an active surface, a back surface, and a plurality of pads disposed on said active surface in a corresponding relationship to said plurality of substrate lands;

electrically attaching said plurality of substrate lands to said plurality of corresponding microelectronic die pads with a plurality of conductive bumps;

positioning said microelectronic die and said substrate such that said microelectronic die is gravitationally below said substrate; and

disposing an underfill material through said through-hole such that said underfill material is dispersed by capillary action between said microelectronic die active surface and said substrate first surface.

8. The method of claim 7, wherein forming said through-hole comprises forming said through-hole by at least one of the methods consisting of drilling, laser ablation, and etching.

9. The method of claim 7, wherein disposing said underfill material comprises positioning an underfill material dispensing device proximate said through-hole and injecting said underfill material into said through-hole.

10. The method of claim 9, wherein positioning said underfill material dispensing device proximate said through-hole comprises positioning a dispensing needle proximate said through-hole.

11. The method of claim 7, wherein disposing said underfill material comprises disposing an epoxy material.

12. The method of claim 7, further including curing said underfill material.

13. A method of fabricating a microelectronic package, comprising:

providing a substrate having a first surface, an opposing second surface, a plurality of lands disposed on said first surface, and at least one wirebond land on said first surface;

forming a through-hole extending from said substrate first surface to said substrate second surface;

providing a microelectronic die having an active surface, a back surface, and a plurality of pads disposed on said active surface in a corresponding relationship to said plurality of substrate lands;

electrically attaching said plurality of substrate lands to said plurality of corresponding microelectronic die pads with a plurality of conductive bumps;

disposing an underfill material through said through-hole such that said underfill material is dispersed by capillary action between said microelectronic die active surface and said substrate first surface;

providing a second microelectronic die having an active surface, a back surface, and at least one wirebond pad disposed on said active surface;

attaching said second microelectronic die back surface to said microelectronic die back surface; and

attaching at least one wirebond between said at least one substrate wirebond land and said second microelectronic die wirebond pad.

14. The method of claim 13, wherein forming said through-hole comprises forming said through-hole by at least one of the methods consisting of drilling, laser ablation, and etching.

15. The method of claim 13, wherein disposing said underfill material comprises positioning an underfill material dispensing device proximate said through-hole and injecting said underfill material into said through-hole.

16. The method of claim 15, wherein positioning said underfill material dispensing device proximate said through-hole comprises positioning a dispensing needle proximate said through-hole.

17. The method of claim 13, wherein disposing said underfill material comprises disposing an epoxy material.

18. The method of claim 13, further including curing said underfill material.

19. The method of claim 13, wherein said attaching said second microelectronic die back surface to said microelectronic die back surface comprises disposing a layer of adhesive therebetween.

20. The method of claim 13, wherein further including positioning said microelectronic die and said substrate such that said microelectronic die is gravitationally below said substrate prior to disposing said underfill material